

SOME NEW SPECIES OF DELPHACIDÆ*

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The following species were, with one exception, taken by the author during the past five years. In the genus *Pissonotus* they form a very considerable addition to the list of our species.

My thanks are due to Professor A. D. MacGillivray of the University of Illinois for going over the manuscript and for valuable help and suggestions. I also wish to thank Professor J. Chester Bradley of Cornell University for the loan and exchange of specimens and Mr. C. P. Alexander also of Cornell University, for the gift of specimens of several desirable species.

The author has planned an extensive study of the Delphacidæ and would be grateful for the loan or exchange of material. He will gladly name specimens for the privilege of retaining desirable duplicates.

Pissonotus guttatus, n. sp.

Brachypterous ♀.—Eyes oval, deeply indented below to receive the antennæ, colour grey; vertex considerably longer than wide, slightly rounded in front, projecting slightly before the eyes; carinæ of the vertex all present, rather indistinct; vertex uniformly black except the caudolateral angles which are slightly yellowish. Carinæ meeting on the front just below the curve of the vertex, extending distinctly from this point throughout the length of the front, indistinct on the vertex; front considerably constricted between the eyes, deep pitchy black above, becoming gradually lighter until it is white at the base; clypeo-frontal suture curved, the clypeus deep uniform black with the median carina distinct; the black colour of the clypeus extends as a band across the anterior coxæ as is characteristic of the genus.

The second segment of the antennæ about one-fourth as long again as the first, with a few protuberances; antennæ uniform pale honey-yellow.

The length of the prothorax from the anterior to the caudal margins about equal to that of the vertex; caudal margin slightly concave, carinæ distinct; anterior portion deep, shiny black; narrow band on posterior margin dirty white.

Legs normal, pale honey-yellow except tips of the tarsi which are black and two slender brown lines on the outer sides of the tibiæ.

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Scutellum triangular, sides very slightly arcuate ; median carina distinct ; lateral carina inconspicuous, reaching the posterior margin ; colour uniform honey-yellow.

Elytra short, extending to the middle of the first abdominal segment, coriaceous, highly polished, veins almost obliterated ; colour pale honey-yellow with an oval blotch of white in the centre of the apical margin ; abdomen honey-yellow but slightly darker than the scutellum and elytra.

Genitalia uniform honey-yellow, paler than the tergum ; pygofers tapering to a rounded point ; plates extending about one-third the length of the pygofers ; anal style white. Length 3.5 mm.

Described from a single female taken at Ithaca, N. Y., Aug. 1st, 1896. Type in collection of Cornell University.

Very close to *P. delicatus* Van Duzee but easily separable from it by the black front, vertex and prothorax. The prothorax lacks the foveæ so conspicuous in *delicatus* and the shape of the front is quite different.

Pissonotus foveatus n. sp.

Brachypterous ♀.—A fairly large species, form long, oval. Vertex slightly rounded in front ; eyes oval, deeply indented below to receive the antennæ ; colour gray, irregularly mottled with black ; vertex slightly longer than wide, slightly wider behind the eyes than before ; fully carinated ; carinæ sharp, except the posterior median, which tends to fade out posteriorly ; the anterior median carina forked just below the apex of the head ; colour of the vertex yellowish white, with a pair of dark brown foveæ just posterior to the forking of the anterior median carina, one on either side of the carina, and another pair similarly situated, but slightly farther caudad ; there is a yellowish fovea located in each posterior lateral angle of the vertex.

Front with sides slightly convex ; median carina sharp throughout ; colour yellowish white marked with brown. These markings vary somewhat, but may in general be described as follows : According to colour, the front may be divided into four regions ; first, just under the vertex a darker area in which may be found two deep brown lines extending across the median carina ; these lines extend to the edge of the front ; the second area is light, and the only markings on it are a pair of brown dots on each side at the outer margin ; this pale area is about equal in width to the first area. Covering about two-thirds of the remainder of the front is the third area, dark and marked like the first area, except that it is darker and less distinctly marked ; in some specimens it is scarcely more than a

dark brown band. The remainder of the front, comprising the fourth area, is yellowish white devoid of markings.

Clypeus uniformly black, with the median carina distinct; the black colour extending in a band across the anterior coxæ as is typical of the genus.

Second segment of the antennæ about one-fourth as long again as the basal segment; basal segment and basal half of the second segment yellowish white; distal half of the second segment deep brown.

Prothorax shorter than head, caudal edge concave; the carinæ distinct; a fovea on each side of the median carina, midway to the lateral carinæ and slightly nearer the cephalic than the caudal margin; colour yellowish white, with varied dark brown spots and blotches on the caudal margin; legs yellowish, with a brown band across the proximal portion of the tibiæ.

Scutellum triangular, sides very distinctly arcuate, carinæ distinct, the lateral carinæ extending to the caudal margin; a brownish fovea on each side of each lateral carina, about midway between the cephalic and caudal margins; colour yellowish brown.

Elytra short, extending slightly beyond the middle of the second abdominal segment, coriaceous, polished, veins indistinct; colour greyish white, irregularly spotted with brown.

First, second and third abdominal segments with the dorsum yellowish brown, with a few brown dots; fourth, fifth and sixth segments with their median portions yellowish brown and their lateral portions deep brown.

Genitalia reddish-brown, pygofer tapering to a blunt point, plates extending about one-third the length of the pygofer, light yellow, tip of the ovipositor much lighter brown, style yellow. Length, 3.25 mm.

Brachypterous ♂.—Smaller; form and markings about as in female, with not quite so much brown.

Genitalia, opening of the pygofer rather narrow, oval; superior wall of the anal tube prolonged into two incurving tusks, the points of which rest upon two large pointed projections extending inward from the inferior wall of the pygofer; colour yellow, except the ends of the tusks and the points of the projections, which are reddish brown. Length, 2.5 mm.

This species was taken quite abundantly on a species of *Compositæ* by the author at Corpus Christi, Texas. Types, taken May 19, 1907, in the author's collection.

Pissonotus variegatus, n. sp.

Macropterous ♀.—Form and size of *P. pallipes*. Head rounded in

front; eyes large and oval, slightly indented below to receive the antennæ; colour yellowish around the edge, black in the centre; vertex about one-third again as long as broad, projecting slightly beyond the eyes, quite strongly rounded in front, in which it differs from *pallipes* where it is nearly straight; the posterior carina wanting, other carinæ sharp and distinct; colour light yellow, except outside the anterior median carinæ, where it is marked by two brown dots on each side.

Front slightly wider below the eyes than between them; median carina distinct throughout the length of the front, forked just below the vertex; colour, anterior two-thirds yellow, much mottled with brown, posterior third pure light yellow; clypeus uniformly black, with the median carina distinct, the black band continuing across the anterior coxæ.

First and second antennal segments subequal, proximal segment and proximal half of the second segment yellow, distal half of the second segment reddish brown, roughened by numerous protuberences.

Prothorax equal in depth to the head, posterior edge concave, almost angled at the centre; carinæ all distinct, lateral ones reaching caudal margin of the prothorax, quite widely divergent; colour brown, marked with yellow, especially in the centre; legs yellow, with a brown band around the distal end of the femora and proximal end of the tibiæ; tips of the tarsi black.

Scutellum triangular with the sides very much arcuate, apex rounded, scutellum about twice as deep as the prothorax; carinæ distinct, reaching to the caudal margin; colour brown with yellow markings. One-fourth of the elytra extending beyond the tip of the abdomen; milky in colour with brown dots along the veins. Genitalia dark brown; pygofers bluntly pointed, plates dark yellow, extending over one-third the length of the pygofers, very much curved; style white. Length, including elytra, 3.5 mm.

Described from a single female taken by the author at Corpus Christi, Texas, June 19, 1907. Type in the author's collection.

Pissonotus divaricatus, n. sp.

Macropterous ♀.—Form and general appearance of *P. basalis*, although not quite so large and heavy an insect; eyes oval, not deeply emarginate below to receive the antennæ.

Vertex a little longer than wide, sides nearly straight, very slightly wider in front of the eyes than behind them; all the carinæ distinct, posterior

foveæ fairly deep ; colour reddish brown with the carinæ and margins light yellowish brown.

Front about twice as long as wide, sides very slightly arcuate, widest a little below the eyes ; clypeo-frontal suture slightly curved, median carina distinct, forked just below the apex of the head ; colour uniform reddish brown except a narrow strip along the clypeo-frontal suture, which is light yellow.

Clypeus uniformly black with the median carina fairly distinct.

Second segment of the antennæ a little more than twice as long as the first segment, second segment roughened by tubercles, proximal segment black, second segment yellowish brown.

Prothorax not quite so deep as the vertex, carinæ distinct, the lateral carinæ quite widely divergent, fading out just before the posterior margin, posterior margin distinctly concave ; colour reddish brown, except the narrow posterior edge, which is almost white.

Coxæ light yellow ; femora and most of the tibiæ reddish brown, tips of the tibiæ and the first two tarsal segments very light yellow, last tarsal segment dark brown, spur almost white with large, prominent, black serrations.

Scutellum almost twice as deep as the prothorax, sides very decidedly arcuate, tip a rounded point, carinæ all distinct, lateral carinæ reaching the posterior margin of the scutellum and curving outward ; colour dark brown, except the tip, which is light yellow, almost white.

Elytra extending one-third their length beyond the tip of the abdomen, veins brown, membrane smoky ; abdomen uniformly dark brown.

Genitalia : Pygofers ending in a blunt point, reddish brown, ovipositor reddish brown at the tip, lighter at the base, plates dark within, lighter on the free edge, apex very gradually curved, extending about one-third the length of the pygofers, style light yellow. Length, including elytra, 3 mm.

Macropterous ♂.—Same form, size and general characters as the female. Genitalia : Opening of the pygofers broad oval, superior wall of anal tube prolonged into long, incurving, tusk-like horns, the points resting in indentations of the inferior wall of pygofers, styles large hook like organs with the hooks pointing outward ; colour dark reddish brown.

Described from a pair taken by the author at Middletown, N. Y., July 12, 1910. Two females of this species were taken at the same locality on July 11 and 18, 1910. Types in the author's collection.

Pissonotus piceus, n. sp.

Brachypterous ♀.—A small species slightly smaller than *P. brunneus* and not so stout. Head short, very slightly curved in front. Eyes slightly indented below to receive the antennæ; colour light gray around margins, black in the centre; vertex about as deep as wide in front, sides curving between the eyes, narrower behind the eyes than before; all the carinæ present, but all rather weak, foveæ not very deep; colour deep shiny black.

Front rather wide and short, sides nearly straight. median carina very faint; anterior three-fourths deep shiny black, posterior one-fourth pure white.

Clypeus uniformly black; median carina but a mere suggestion; the black band carried across the anterior coxæ as usual; posterior of this a band of white and towards the tip of the abdomen, black.

Basal segment of the antennæ about one-third as long as the second segment; basal segment brown, second segment honey-yellow spotted with white, tuberculate.

Prothorax about as deep as the head, posterior margin very slightly concave, median carina practically indistinguishable, lateral carinæ distinct for about two-thirds of their length and then fading out; colour pure white.

First and second pairs of legs with the coxæ light brown, shading through black on the femora and tibiæ to white on the first two tarsal segments, the last tarsal segment black, tibiæ of the first and second pairs of legs foliaceous; third pair of legs shading from dark brown at the base of the femora to honey-yellow on the tibiæ to white on the tarsi, tips of the tarsi black.

Scutellum triangular, sides straight, not visible for its entire breadth, covered by the prothorax on its outer edges; median carina indistinct, lateral carinæ short, curved outward, poorly defined; colour uniform deep shiny black.

Elytra short, not quite covering the first abdominal segment, coriaceous, polished, veins indistinct; colour, basal three-fourths deep shiny black, posterior one-fourth pure white.

Abdomen uniform shiny black; genitalia deep reddish brown, almost black; pygofers tapering to a blunt point, plates very short, extending only one-fourth of the length of the pygofers, only a small edge visible; style white. Length, 2.5 mm.

A very pretty and delicate insect. The foliaceous tibiae recall *Phyllodinus*, but the carinae of the prothorax are straight and the other characters agree with *Pissonotus*; it may deserve to be placed in a new genus, but for the present I prefer to place it in *Pissonotus*. The species is very easily identified by the white thorax and white margin of the elytra and by the deep shiny black of the rest of the body. Described from a specimen taken by the author at Middletown, N. Y., July 11, 1910. Two other specimens were taken at the same locality July 18 and 21, 1910. Type in the author's collection.

Pissonotus binotatus, n. sp.

Brachypterous ♀.—Form and general appearance of *P. marginatus*, but considerably smaller.

Eyes oval, deeply indented below to receive the antennae; colour dark gray, almost black, with a yellow margin; vertex about as long as wide, very slightly produced before the eyes, anterior margin slightly curved; carinae all present, very pronounced, posterior foveae very deep; colour uniform dark reddish brown.

Front about one and one-third times as long as broad, widest below the eyes, sides slightly arcuate; clypeo-frontal suture straight, median and lateral carinae quite prominent, median carina forked just below the apex of the head; colour uniform reddish brown, except a very narrow band along the clypeo-frontal suture, which is light yellow.

Clypeus of the form of a truncated triangle; median carina fairly prominent; colour black, the black band extending across the anterior coxae.

Basal segment of the antennae a little less than one-half the length of the second; the second segment lacks the protuberances so often found; basal segment reddish brown, second segment light yellow.

Prothorax a little deeper than the head, caudal margin almost straight, very slightly emarginate on the sides and a suggestion of an emargination in the centre; median carina very prominent, lateral carinae strong on proximal two-thirds of the prothorax, fading out before reaching the posterior margin; colour uniform reddish brown.

Anterior legs yellow, lineated with brown; second and third pairs of legs with yellow coxae, femora and proximal half of tibiae brown, the tibiae becoming gradually lighter in colour toward the distal end, the distal end of the tibiae and first two tarsal segments light yellow, almost white; last tarsal segment dark brown; tarsal spur rather small, light yellow, almost white.

Scutellum triangular, about one and one-third times as deep as the prothorax, sides straight, median and lateral carinæ prominent, the latter attaining the posterior margin; colour uniform reddish brown.

Elytra short, practically covering the first abdominal segment, highly polished, veins indistinct; colour reddish brown, with two yellowish white dots on the apical margin of each elytron.

Abdomen uniformly reddish brown, a prominent carina extending along the middle of each tergum; genitalia reddish brown, pygofers ending in rather a sharp point; plates short, extending only one-third the length of the pygofers, a little lighter in colour; style white. Length, 2 mm.

Brachypterous ♂.—Form and markings the same as that of the female, considerably smaller in size. Genitalia, aperture of the pygofers quite long and narrow, superior wall of the anal tube produced in long outcurving horns, these rest on projecting points of the ventral margins of the pygofers; styles small; anal style light yellow, rest of the genitalia dark reddish brown. Length, 1.5 mm.

This species resembles *P. marginatus* quite closely. It is a much smaller species, there are distinct differences in the proportions of the front and antennæ, the spur is smaller proportionally. There are also differences in the genitalia and some noticeable colour differences. *P. binotatus* lacks the white on the prothorax, the front is much darker, and has two white spots on the apical margin of the elytra instead of a full white band as in *marginatus*.

Type of the male and female taken at De Witt, Mitchell Co., Ga., April 6, 1912, by the author. Types in the author's collection.

Liburnia dolera, n. sp.

Macropterous ♂.—A medium-sized form for this genus. Eyes oval, deeply and narrowly indented below to receive the antennæ; colour gray, darker in the centre. Vertex slightly longer than wide, projecting a little beyond the eyes, carinæ distinct, except the posterior median, which is quite faint; foveæ deep; colour dark reddish brown.

Front widest a little below the eyes, constricted considerably between the eyes, sides curved, the median and lateral carinæ sharp and prominent, the former forked at the vertex; clypeo-frontal suture slightly curved; colour reddish brown, with the ventral portions of the lateral carinæ dark yellow. Clypeus a lighter brown than the front, the carina distinct.

Basal segment of the antennæ one-third the length of the second segment, dark brown; second segment rather thick, tubercled; light yellow in colour.

Prothorax a very little deeper than the vertex ; hind margin concave, almost angled at the centre ; carinæ very distinct ; colour uniform shiny reddish brown.

Legs brown, becoming lighter toward the distal end of the tibiæ ; the tarsi yellow ; spur wide at base and very finely serrate.

Scutellum triangular, about twice as deep as the prothorax, sides arcuate, apex a rather sharp point, carinæ distinct, the lateral carinæ attaining the posterior margin, the median carina is obsolete toward the apex ; colour shiny, reddish brown, with the margins and apex yellow.

Elytra nearly twice as long as the abdomen ; colour smoky brown, veins darker brown with dark dots along them.

Tergum of the first two abdominal segments yellow, remainder of the abdomen reddish brown. Genitalia, aperture of the pygofer large, oval, wider than long ; ventral edge of the pygofer deeply notched, styles large, broad, divergent from their base, following the curve of the pygofer to the anal tube, a few long setæ at their apical end. Length, including elytra, 3.5 mm.

Taken on reeds by the author in Renwick Swamp, Ithaca, N. Y., July 20, 1908. Five specimens are before me, one of these shows much more yellow on the vertex and front. Type in the author's collection.

This species suggests the macropterous form of *L. lineatipes* Van Duzee, but the colouring is different and, besides other minor differences, the genitalia are decidedly unlike that species.

Achorotile foveata, n. sp.

Macropterous ♀.—Eyes oval, deeply emarginate below to receive the antennæ ; colour gray. Vertex as wide as long, rounded before, extending a little beyond the eyes ; carinæ distinct, except the posterior median, which is weak ; posterior foveæ deep ; colour yellowish brown, lighter posteriorly.

Front twice as long as wide, widest near the middle, sides gently curving ; clypeo-frontal suture straight ; the median carinæ curved, following the curve of the sides to the front ; just outside of each median carina there is a row of pustules, six on each side, three near the vertex and three near the clypeus ; between these two groups are two pustules on each side along the outer margin of the front ; colour deep reddish brown.

Clypeus shiny black with an indistinct carina. Second segment of the antennæ about one and one-third times as long as the first, covered with pustules ; basal segment reddish brown, second segment yellowish brown.

Prothorax two-thirds as deep as the vertex; lateral carinæ distinct, following the curve of the eye; behind each carina a row of seven pustules; median carina faint, a puncture on each side of it about the middle of the prothorax; posterior margin quite deeply concave; colour deep reddish brown.

Legs yellow lineated with brown; tarsal claws black; spur triangular, finely toothed. Scutellum a little more than twice as deep as the prothorax; triangular, sides strongly arcuate, terminating in a rather sharp point; two pustules on each side near the middle of the lateral margin; median carina distinct, lateral carinæ rather faint, divergent; colour polished black with yellowish tip.

Elytra extending one-third of their length beyond the abdomen; veins brown, membrane slightly smoky.

Abdomen black, except the dorsum of the first two segments, which is yellowish; along the lateral margins of the dorsum of each segment is a transverse row of four pustules.

Genitalia: pygofers tapering to a blunt point, dark reddish brown; plates about one third as long as the pygofers, only a narrow edge showing, light brown in colour; ovipositor and anal tube dark honey-yellow.

Length, including elytra, 3.5 mm.

Described from a female taken by Professor J. Chester Bradley at Felton, Santa Cruz Mts., California, May 17, 1907. Type in the collection of Cornell University.

This species may be readily told from *A. albosignata* by the deeper vertex, the different coloration, and by the presence of four instead of two pustules on each side of the abdominal segments.

THE NORTH AMERICAN ÆSHNID DRAGON-FLIES.

At the present time, when the air is full of nomenclatural discussion, when there are many entomologists who are devoting themselves almost exclusively to naming and classifying insects from dried skins, "systematists" they are called, and we often seek in vain for the system, it is as refreshing as a woodland brook to a tired traveller to read a monograph of the nature of Dr. Walker's "North American Dragon-flies of the genus *Æshna*."* Here we have a systematic study of a group in which the

*University of Toronto Studies, Biological Series, No. 11, VIII, 213 pp., 28 plates (6 coloured). Publ. by the Librarian, University of Toronto Library, 1912. \$2.00.

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